

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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in its capacity as elected Office

Date of mailing (day/month/year) 05 May 2000 (05.05.00)	
International application No. PCT/IL99/00238	Applicant's or agent's file reference P-1653-PC
International filing date (day/month/year) 06 May 1999 (06.05.99)	Priority date (day/month/year) 07 May 1998 (07.05.98)
Applicant ILAN, Gabriel et al	

1. The designated Office is hereby notified of its election made:

☒

in the demand filed with the International Preliminary Examining Authority on:

30 November 1999 (30.11.99)

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in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was☐

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Facsimile No.: (41-22) 740.14.35

Authorized officer

Pascal Piriou

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

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NOTIFICATION CONCERNING
AMENDMENTS OF THE CLAIMS(PCT Rule 62 and
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From the INTERNATIONAL BUREAU

To:

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in its capacity as International Preliminary Examining Authority

Date of mailing (day/month/year) 05 May 2000 (05.05.00)	International filing date (day/month/year) 06 May 1999 (06.05.99)
International application No. PCT/IL99/00238	
Applicant ART ADVANCED RECOGNITION TECHNOLOGIES INC. et al	

The International Bureau hereby informs the International Preliminary Examining Authority that no amendments under Article 19 have been received by the International Bureau (Administrative Instructions, Section 417).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer Pascal Piriou Telephone No. (41-22) 338.83.38
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PATENT COOPERATION TREATY

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From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

EITAN, PEARL, LATZER & COHEN-ZEDEK
2 Gav Yam Center
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ISRAËL

Date of mailing (day/month/year) 25 June 1999 (25.06.99)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P-1653-PC	
International application No. PCT/IL99/00238	International filing date (day/month/year) 06 May 1999 (06.05.99)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input checked="" type="checkbox"/> the inventor	<input type="checkbox"/> the agent <input type="checkbox"/> the common representative
Name and Address KADOSH, Arie Menora Street 13/25 69416 Tel Aviv Israel	State of Nationality IL	State of Residence IL
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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Dominique DELMAS
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PATENT COOPERATION TREATY

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IMPORTANT NOTIFICATION

International application No.
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06 May 1999 (06.05.99)

1. The following indications appeared on record concerning:

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3. Further observations, if necessary:

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International application No.: PCT/IL99/00238	International filing date (day/month/year) 06 May 1999 (06.05.99)

1. The following indications appeared on record concerning:

☒ the applicant ☒ the inventor ☐ the agent ☐ the common representative

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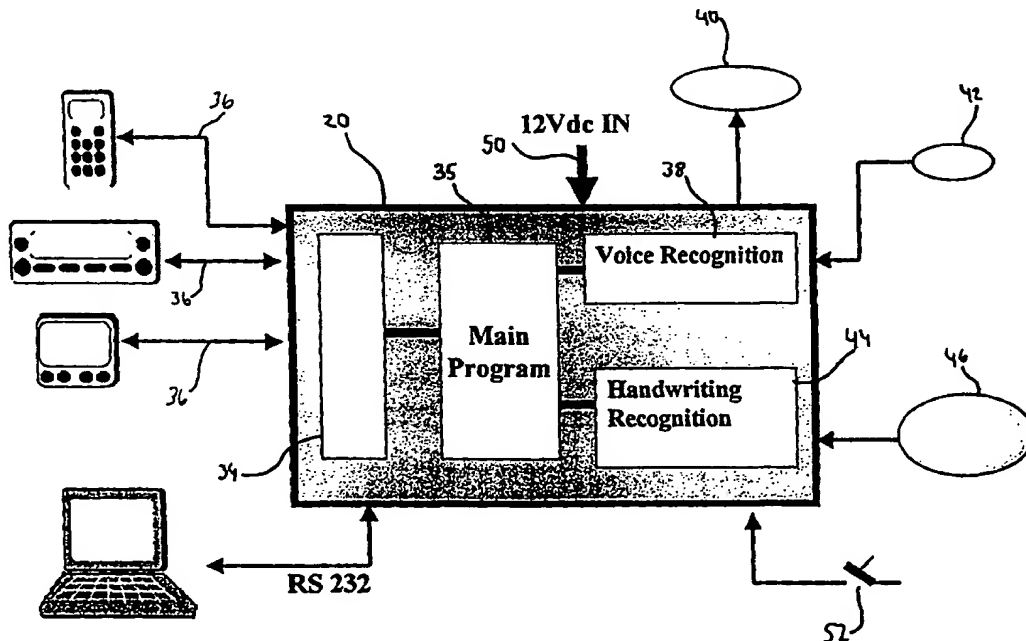
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(54) Title: HANDWRITTEN AND VOICE CONTROL OF VEHICLE COMPONENTS



(57) Abstract

A recognition system (20) for use in a vehicle or the like includes a handwriting recognizer (44) and a voice recognizer (38) for receiving handwriting and voice signals, where the signals are associated with commands used to operate with a variety of vehicle appliances. Such appliances may include, but are not limited to, car alarms (32), electric windows, personal computers (28), navigation systems (26), and audio (30) and telecommunications equipment (24).

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HANDWRITTEN AND VOICE CONTROL OF VEHICLE COMPONENTS

FIELD OF THE INVENTION

The present invention relates to handwriting and voice recognition systems in general, and more particularly to handwriting and voice recognition systems for use in a
5 vehicle.

BACKGROUND OF THE INVENTION

Voice recognition systems have been utilized in a variety of applications to command electronic devices. Recent attempts have been made to employ such voice
10 recognition systems to allow drivers to control automobile appliances, such as vehicle-based cellular telephones or electrical windows. Such applications make it possible for drivers to keep their eyes on the road instead of on the appliances while driving, thereby enabling drivers to drive more safely. However, such systems are adversely affected by the ambient noise present in environments such as the interior of a
15 vehicle, particularly when the windows are open while driving at high speeds. Thus, the need exists for vehicle appliance control that allows a driver to keep his eyes on the road while not being affected by ambient vehicle noise.

SUMMARY OF THE INVENTION

20 It is an object of the present invention that a driver may operate automobile appliances safely while driving. A system is provided whereby the driver's eyes need not leave the road, and the driver's hands need not leave the steering wheel or gearshift, when operating an automobile appliance.

It is a further object of the present invention to simplify the operation of vehicle appliances using an improved command recognition system.

It is yet another object of the present invention to provide a command recognition system capable of use in noisy environments.

5 It is another object of the present invention to simplify command recognition operation when used by different users.

It is an advantage of the present invention to combine handwriting and voice recognition to eliminate the need for speaker independent voice recognition technology which today is hard to implement in a noisy environment

10 It is an additional advantage of the present invention that handwriting recognition for providing commands is not influenced by the automobile's noisy environment

It is yet another advantage of the present invention to provide command recognition operation independent of noise generated by other persons in the vehicle.

15 It is a feature of the present invention that devices may be operated by both voice and handwriting commands to increase the available instruction set for sophisticated appliances such as personal computers or cellular telephones when sending short text messages.

20 It is an additional feature of the present invention to offer combined handwriting and speaker dependent recognition in order to achieve high recognition credibility desirable for work in a vehicle environment.

It is an additional feature of the present invention that double validation of a user identity is employed using both the voice print and the signature characteristics of the user.

The present invention is embodied in an improved user interface device for controlling at least one appliance within a vehicle comprising a command recognition module having a command data set. The command recognition module is adapted to receive handwriting and voice signals, to associate said handwriting and voice signals with the command data set such that at least one command is used by said at least one appliance. The command recognition module is further adapted to generate a command signal sequence upon associating at least one of the handwriting and/or voice signals with the at least one command. A main module operatively connects to the command recognition module and operates to relay the command signal to the at least one appliance. An appliance interface connects between the at least one appliance and the main module and is adapted to relay the command signal to the appliance.

The command recognition module further includes a microphone and a voice recognizer operatively connected to the microphone to receive voice signals and to generate a command signal upon associating at least one of the voice signals with the at least one command. Furthermore, a touchpad and a handwriting recognizer operatively connected to said touchpad is included to receive handwritten signals and to generate a command signal upon associating at least one of said handwritten signals with said at least one command. Handwritten signals may include handwritten characters, words, numbers, scribbles, or any gesture that a user can perform with his hands or fingers, including three dimensional gestures, thus the touchpad can be replaced by any kind of hand-or-finger responsive input device like a joystick, a three dimensional mouse, etc., or any other known body-part-responsive input device adaptable to a human communication method, such as a head movement. A speaker is connected to either the command recognition or the main module to give feedback to the driver. The feedback

may be in the form of a playback of the recognized command before its execution and/or talking menus using recorded speech or synthetic speech such as known text-to-speech (TTS) technology. A transparent display mounted on the front window may also be used to generate a visual feedback. Alternatively, after a character or digit is entered and/or after an entry sequence is completed (e.g., word, telephone number) the entry may be played back or displayed. Other features and advantages of this invention will be made apparent upon review of the drawings and detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the appended drawings in which:

Figs. 1 and 2 are functional block diagrams of a voice and handwriting recognition system constructed and operative in accordance with a preferred embodiment of the present invention; and

Fig. 3 is a functional block diagram of a dual validation mode voice and handwriting recognition system constructed and operative in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

With reference to the drawings for purposes of illustration, the present invention is embodied in a command recognition device 20 (Fig. 1) that enables the operation of electronic appliances in a vehicle or the like, represented conceptually by a steering wheel 18, by using handwritten commands through the use of handwriting recognition

technology known in the art. Known voice recognition technology may additionally be combined with handwriting recognition technology to provide a reliable and robust method of interacting with such electronic appliances, systems or devices. Electronic appliances 22 may include, but are not limited to, a cellular telephone 24, a Global
5 Positioning System (GPS) navigation system 26, a personal computer (PC) 28, a radio 30, an alarm system 32, electric windows (not shown), a sunroof (not shown), and the like.

With reference to Fig. 2, appliances 22 connect to the device 20 through an appliance interface 34. The appliance interface 34 is preferably adapted for use with one
10 or more appliances or types of appliances and may be adapted to conform with appliance hardware standards and/or software protocols for remote operation thereof. The interface module 34, implemented in hardware and/or software, is the physical module with which appliances connect via electrical connectors 36. Interface 34 is controlled by a main program module 35 which selects the commands to be sent to each appliance. Interface
15 module 34 also produces the correct voltage and current needed to communicate with the appliances. For example, if the user wishes to communicate with a PC via the RS232 protocol, then translation of digital commands produced by the main program module 35 into actual +/-12 volt pulses (as required by the RS232 protocol) will be performed by the interface module 34. Command sets corresponding to each of the appliances is
20 maintained by the main program module 35. An example of such interface adaptability is found in conventional universal remote control devices for use with entertainment systems where the remote control device may be trained by the user to cooperate with appliances and/or includes a library of known appliances and specific commands corresponding to such appliances. In the latter instance the user selects the library of

commands that corresponds to the appliances. The connection leads 36 between the appliance and the interface may vary and include, but are not limited to, wire, infrared, serial, or bus connections. In an alternative embodiment, the appliances may be assembled with the interface module 34 and may include any number of conventional interface configurations.

Device 20 preferably includes a voice recognizer 38 connected to a microphone 42 and a handwriting recognizer 44 connected to writing pad 46. Command recognition as used herein refers to handwritten or spoken command signals being recognized by a handwriting or voice recognizer engine and then matched with preprogrammed commands contained in a command data set which are associated with the command signal.

The voice recognizer 38 receives voice commands through the microphone 42 and searches for a matching voice command within a known list of voice commands tailored for the appliances to which device 20 is connected. The microphone may be placed in a vehicle console, sun visor, or in any location suitable for the convenient reception of voice commands from the driver or other passengers. Voice commands may also be input via an external microphone, such as via a cellular phone, or otherwise into the voice recognizer such as is described in assignee's copending U.S. Patent Application No. 09/002,616, the disclosure of which is incorporated herein by reference. It will be appreciated that such voice commands may be trained by the user and/or provided in a pre-trained library of appliance brand specific commands.

The handwriting recognizer 44 receives symbols provided by the user through handwriting pad 46. The handwriting pad 46 is preferably located in a position convenient for the driver such as on the steering wheel or on the gearshift. Alternatively,

handwriting commands may be input via an external touchpad, such as a laptop's touchpad connected to device 20. A handwriting recognizer of the type suitable for this purpose is disclosed in U.S. Patent Nos. 5,659,633 and 5,774,582 and U.S. Patent Application Nos. 08/528293, 08/418530, 08/282187, and 08/878741, the disclosures of which are incorporated herein by reference. It will be appreciated that handwritten symbols corresponding to appliance commands may be trained by the user and/or provided in a pre-trained library of application specific commands.

It will be appreciated by those skilled in the art that the command libraries for the command recognition module may include a standard set of commands adapted for use with appliances such as cellular phones or personal computers, such as commands relating to voice dialing, number dialing, getting e-mail, operating an alarm system, and the like.

Main program module 35 provides an interface to control the transfer and distribution of commands between the appliance interface 34 and the recognition modules 38 and 44. The device 20 preferably draws power from the car's voltage through a direct connection, being connected to the lighter outlet or directly to the car battery. Device 20 may alternatively operate independently on DC batteries.

A switch 52 is included to permit switching of the device between an operational mode and a set-up/training mode. A function of the main program module 35 is to combine and coordinate the recognition modules 38 and 44 in order to produce the proper command to the chosen appliance. The first command after entering the recognition or operation mode should be related to identifying the appliance which the user wishes to control. Alternatively, a default appliance or the last appliance used before system shutdown may be used. Following appliance selection, the main program

module 35 will switch to the chosen appliance, sending commands recognized by the voice recognizer 38 and/or the handwriting recognizer 44 to that specific appliance. It is the role of the main program module 35 to associate the recognized command given by the user and the proper appliance command for the appliance selected.

5 The voice and handwriting recognizers 38 and 44 search for a matching voice or handwriting command in a library of commands. There are preferably separate libraries for every appliance. Once an appliance is selected, the main program module 35 instructs the recognizers to load the proper command libraries, typically one for voice and one for handwriting. Alternatively, some libraries are loaded and the recognizers are
10 notified which libraries should be used during the search for a matching command. Subsequently, upon receiving an input signal, the recognizers send an identifier of the appliance command that was recognized to the main program module 35. Given this identifier and the appliance that has been selected, the main module will interpret the command and send it to the selected appliance via the appliance interface 34. To enable
15 global commands, such as pick up the cellular phone, there are also voice/handwriting signals that will be recognizable no matter what appliance has been currently selected. Representations of these signals will be loaded in every library for use by the recognizers, or in a global library, and will have unique identifiers that will not be used by any other appliance so that the main program module 35 will always be able to
20 interpret them. Furthermore, a "double validation mode" is provided where the main program module 35 validates that both recognizers returned identifiers corresponding to the same command, otherwise the command will be rejected. In order to increase the effectiveness of the system in the presence of noise, a tolerance level may be set. For example, the voice recognizer 38 could return the identifiers of several best matches

instead of just one identifier. Should one of the identifiers correspond to an identifier returned from the handwriting recognizer 44, this may be deemed an acceptable validation. Additionally, a "conforming mode" is also provided in order to allow two commands to be entered simultaneously. For example, when the user says "radio" and
5 writes "5" the device will turn on the radio and select station 5 immediately. Furthermore, a "user verification/authentication mode" is provided based on a combination of the user's voice and handwriting characteristics rather than the known user verification modes that operate on these characteristics separately. The user may receive feedback from device 20 through loudspeaker 40 indicating the recognized
10 command was received and sent to the appliance.

It is appreciated that the same handwriting gesture or spoken command may have a different meaning when being interpreted by the main program module 35 depending on the appliance selected. For example, the spoken word "up" might mean "close window" if "electric windows" have been selected, but it might also mean "increase the volume"
15 when operating the radio. It is further appreciated that a handwriting gesture or spoken command may operate more than one appliance at a time, thus providing a "macro" capability where one spoken\handwritten gesture is associated with a series of commands. For example, a user might say "Jill's settings," whereupon device 20 adjusts the seats, mirrors, and steering wheel, and turns on the radio and tunes in Jill's favorite
20 station.

The appliance interface 34, command recognition modules 38 and 44, and main program module 35 may operate on any conventional hardware platform having a CPU and memory adequate to carry out the recognition functions in real time and capable of storing the command libraries. Programming logic may be stored in any type of

non-volatile memory, for example, on memory chips such as flash memory or EPROMs. Optionally, command libraries may be included on removable memory modules (not shown) allowing for user training to occur on a conventional PC or to provide appliance specific libraries tailored to specialized needs. The libraries may also be loaded from a
5 PC to device 20 using communication protocols such as RS232. A CPU and memory configuration of the type for this purpose includes the H8/3040 microcontroller, commercially available from Hitachi, and AMD29F800 Flash memory, commercially available from Advanced Micro Devices.

In a preferred embodiment, the device 20 has two major operation modes, namely,
10 recognition and training modes. Switching between operation mode and training mode is controlled by the switch 52. The method for switching between modes using the switch may vary. For example, if the user wishes to enter recognition mode, he may press the switch once to enter operation mode, enabling device 20 to accept spoken or written commands. If the user wishes to train the device 20 for a new command, he may rapidly
15 press the switch twice so that the main program may switch to training mode. Other global commands may be associated with the switch such as for ending a conversation via cellular phone or for closing an application window on the computer. Operation Mode

Device 20 in operation mode receives voice commands through a microphone 42.
20 The microphone 42 receives the human voice and transforms it into an electrical signal. This signal is then amplified and digitized by the voice recognizer 38. After digitization, the voice recognizer 38 utilizes processing software in order to process the voice signal and perform recognition by searching for a matching voice command in a library which resides in memory. Following association of the voice signal with a command from the

library, the voice recognizer 38 sends the command identifier to the main program software module 35 which then interprets it according to the current input state of device 20 (e.g., appliance has been selected, waiting for appliance command input) and sends the command sequence to the proper appliance(s). The speaker 40 may be used by the
5 recognition modules 38 and 44 or by the main program module 35 to optionally convert the command signal into a computer generated voice signal or other playback signal to provide the user with feedback as an indication that the voice signal was received and properly understood.

Handwritten commands are received through writing pad 46, such as a touchpad,
10 that when touched at a certain point transmits the touch point's X and Y coordinates. In the case of a touchpad, the input may be provided with a finger. The handwriting recognizer 44 receives the character, gesture, or word written on the touchpad and searches for a handwriting command match in a library of pre-trained characters, gestures, and words. Once the handwriting recognizer 44 has found a match, it signals
15 the main program module 35. Preferably, the handwriting recognition library includes pre-trained alphanumeric characters, gestures, and symbols so the user does not have to train the recognizer to recognize them. However, the user may have the option of generating symbols convenient to the user for association with appliance commands.

Training Mode

20 Training each recognizer 38 and 44 means associating a spoken command or a written symbol\gesture\word\character with a command or command sequence that is understood by at least one of the appliances by programming such a relationship into the device 20. For example, the gesture "arrow up" could mean "close the window, " or the uttering a name could activate the cellular phone to dial that person's telephone number.

The communication protocols of the appliances used in the present invention are typically pre-programmed with device 20. Where a personal computer or other easily adaptable computing device is used, software within the PC may be provided to communicate with the present invention. In such instances the number of possible commands depend upon the type of software and operations used by the user. In order to associate a command with an operation, the user might program the commands as part of the training process. Where operating appliances such as an alarm or a window, device 20 must possess the actual signals that operates those appliances. Appliance Examples

A typical example of the operation of the present invention may be seen with respect to a radio in which the command set library for the radio was pre-trained into device 20 or entered by the user during training mode. After selecting recognition mode, the user says the word "radio". The main program module 35 now routes all the recognized commands to the radio. The user then writes or says the number "5." The main program then translates the recognized "5" to a digital command understood by the radio as "jump to station number 5" and sends it via interface 34 to the radio. Feedback may be provided for every operation performed by the user. For example, when the user says "radio" the loudspeaker says "radio is activated" using TTS technology. When the user writes "5" the loudspeaker says "station 5 selected" and optionally the name of the station, if available.

When activating or deactivating a vehicle alarm system, the user may train device 20 to learn both spoken and handwritten passwords, signatures, and other user-specific signal characteristics as can be seen with additional reference to Fig. 3. Only after recognizing both passwords will the main program module 35 send a command to activate or deactivate the alarm system. Another related application provides for

appliances such as the seat and mirrors to be adjusted according to the user identification using personalized command and settings libraries, thus accommodating any one of several drivers of the same car.

When operating a car navigation system, the user may navigate the system's menus
5 by voice and then enter names of streets by writing them on the touchpad.

While the present invention has been described with reference to a few specific embodiments, the description is intended to be illustrative of the invention as a whole and is not to be construed as limiting the invention to the embodiments shown. It is appreciated that various modifications may occur to those skilled in the art that, while
10 not specifically shown herein, are nevertheless within the true spirit and scope of the invention.

CLAIMS

What is claimed is:

1. Apparatus for controlling at least one appliance within a vehicle, said device comprising:

5 a command recognition module having a command data set and adapted to:
receive a handwritten signal,
associate said handwritten signal with at least one command in said command data
set for controlling said at least one appliance, and
communicate a command signal associated with said command to said appliance.

10

2. The apparatus of claim 1 wherein said command recognition module includes a
microphone and a voice recognizer operatively connected to said microphone to:

receive a voice signal, and
associate said voice signal with said at least one command in said command data
15 set for controlling said at least one appliance.

3. The apparatus of claim 1 wherein said command recognition module includes a
touchpad and a handwriting recognizer operatively connected to said touchpad to receive
said handwritten signal.

20

4. The apparatus of claim 1 wherein said command recognition module includes:
a microphone and a voice recognizer operatively connected to said microphone to:
receive a voice signal, and

associate said voice signal with said at least one command in said command data set for controlling said at least one appliance; and

a touchpad and a handwriting recognizer operatively connected to said touchpad to receive said handwritten signal.

5

5. The apparatus of claim 1 including:

said command data set having a plurality of commands; and

a main module operatively connected to said command recognition module and operative to communicate said command signal to said at least one appliance.

10

6. The apparatus of claim 5 including:

an appliance interface connected between said at least one appliance and said main module and adapted to communicate said command signal to said appliance.

15 7. The apparatus of claim 6 including:

a microphone and a voice recognizer operatively connected to said microphone to: receive a voice signal, and

associate said voice signal with said at least one command in said command data set for controlling said at least one appliance; and

20 a touchpad and a handwriting recognizer operatively connected to said touchpad to receive said handwritten signal.

8. The apparatus of claim 7 wherein said command data set includes alphanumeric characters.

9. The apparatus of claim 7 wherein said command data set includes symbolic characters.

5 10. The apparatus of claim 7 wherein said at least one appliance is a cellular telephone and said command data set includes cellular telephone commands and alphanumeric characters.

11. The apparatus of claim 7 wherein said at least one appliance is a personal
10 computer and said command data set includes computer instructions and alphanumeric characters.

12. The apparatus of claim 7 wherein said command data set is associated with a predetermined set of voice signals.

15

13. The apparatus of claim 7 wherein said command data set is associated with a predetermined set of handwritten signals.

14. The apparatus of claim 7 wherein said command data set is associated with a
20 predetermined set of handwritten and voice signals.

15. The apparatus of claim 7 wherein said command data set is associated by a user with at least one voice signal.

16. The apparatus of claim 7 wherein said command data set is associated by a user with at least one hand signal.
17. The apparatus of claim 7 wherein said command data set is associated with
5 handwritten and voice signals modifiable by said user.
18. The apparatus of claim 7 wherein said appliance is a car alarm.
19. The apparatus of claim 7 wherein said device connects to a plurality of
10 appliances and said main module and appliance interface cooperatively distribute said command signals to said appliances.
20. A method of controlling an appliance within a vehicle comprising the steps of:
providing a command recognition module having a command data set including a
15 touchpad and a handwriting recognizer operatively connected to said touchpad;
receiving handwritten signals;
associating said handwritten signal with at least one command in said command
data set for controlling said at least one appliance, and
communicating a command signal associated with said command to said
20 appliance.

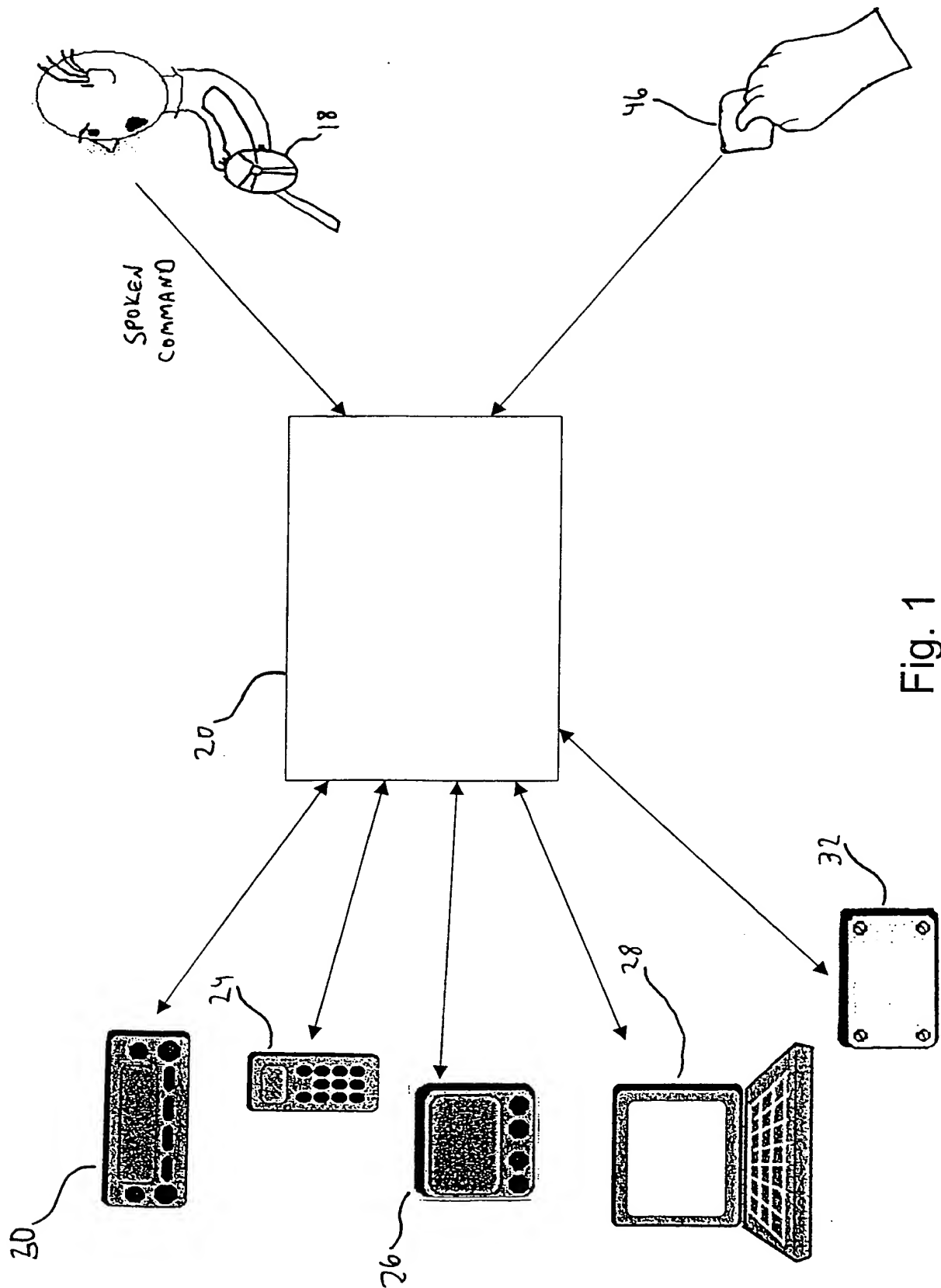


Fig. 1

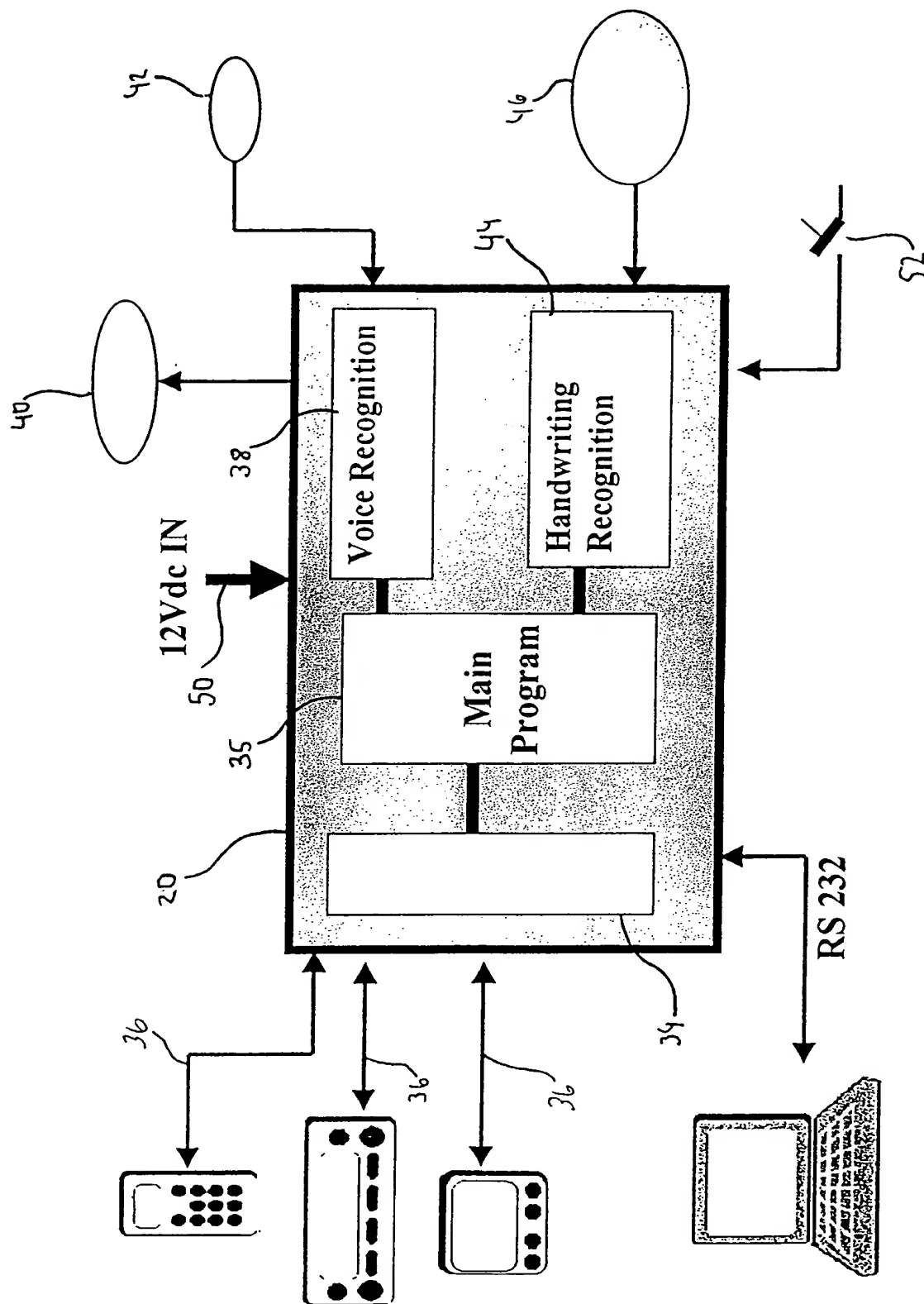


Fig. 2

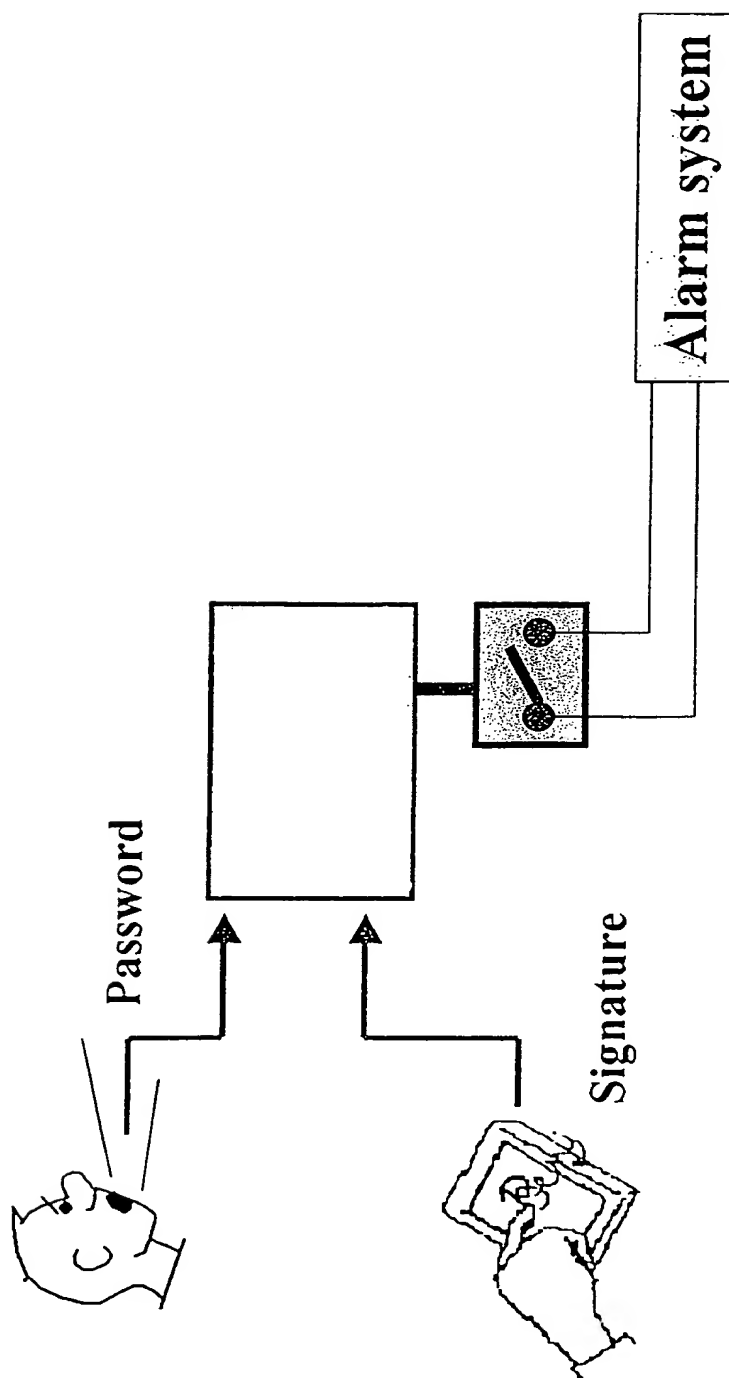


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL99/00238

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 17/00; B60L 1/00, 3/00; H02G 3/00

US CL : 701/1,36,49; 307/9.1, 10.1, 10.2

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 701/1,36,49; 307/9.1, 10.1, 10.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,827,520 A (ZEINSTRA) 02 May 1989, see abstract.	1-20
A	US 4,731,769 A (SCHAEFER et al.) 15 March 1988, see abstract.	5, 6, 9, 16, 19
A	US 5,091,856 A (HASEGAWA et al.) 25 February 1992, Fig. 1.	5, 6, 8, 19
A	US 5,033,000 A (LITTLEJOHN et al.) 16 July, 1991, abstract.	1, 9
A	US 5,404,443 A (HIRATA) 04 April 1995, abstract and Fig. 1.	1-20
A	US 5,555,502 A (OPEL) 10 September 1996, abstract, Fig 2.	1, 20

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

01 SEPTEMBER 1999

Date of mailing of the international search report

30 SEP 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
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Washington, D.C. 20231

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Authorized officer

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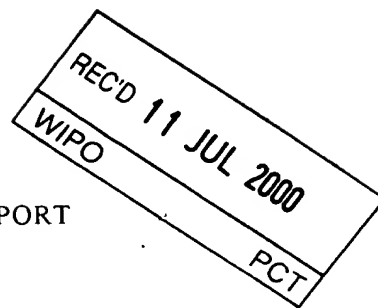
Telephone No. (703) 308-1113

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



16

Applicant's or agent's file reference P-1653-PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/AL99/00238	International filing date (day/month/year) 06 MAY 1999	Priority date (day/month/year) 07 MAY 1998
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant ART ADVANCED RECOGNITION TECHNOLOGIES INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 30 NOVEMBER 1999	Date of completion of this report 26 APRIL 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer WILLIAM CUCHLINSKI <i>Diane Smith</i>
Facsimile No. (703) 305-3230	Telephone No. (703) 308-1113

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IL99/00238

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed☒ the description:pages 1-13, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of ☒ the claims:pages 14-17, as originally filedpages NONE, as amended (together with any statement) under Article 19pages NONE, filed with the demandpages NONE, filed with the letter of ☒ the drawings:pages 1-3, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of ☒ the sequence listing part of the description:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of 2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.These elements were available or furnished to this Authority in the following language which is:☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages none☒ the claims, Nos. none☒ the drawings, sheets/fig none5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IL99/00238

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)

Claims 1-20 YESClaims none NO

Inventive Step (IS)

Claims 1-20 YESClaims none NO

Industrial Applicability (IA)

Claims 1-20 YESClaims none NO

2. citations and explanations (Rule 70.7)

Claims 1-20 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest an apparatus or method for controlling at least one appliance within a vehicle, comprising a command recognition module with a command data set for receiving and associating a handwritten signal with a command in the data set, and then communicating a command signal (associated with the command) to the appliance being controlled.

Claims 1-20 meet the criteria set out in PCT Article 33(4), because the vehicle appliance control system and method can be made and used in industry.

----- NEW CITATIONS -----

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IL99/00238

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

CLASSIFICATION:

The International Patent Classification (IPC) and/or the National classification are as listed below:

IPC(7): G06F 17/00; B60L 1/00, 3/00; H02G 3/00 and US Cl.: 701/1,36,49; 307/9.1, 10.1, 10.2